PDF Versions of Fuel Cell Connection are posted at http://www.usfcc.com/resources/backissues.html

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FUEL CELL CONNECTION - May 2006 Issue

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News on U.S. Government Fuel Cell Programs
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1. Protonex Delivers Soldier Power Fuel Cell Systems to Air Force
Protonex has delivered prototypes of its P2 soldier fuel cell power system to the U.S. Air Force. The prototypes were developed under a Dual-Use Science and Technology (DUST) Program contract awarded to the company by the Air Force in April 2003. The P2 system can produce up to 50 watts of continuous power and would replace batteries for powering portable military equipment. The Air Force Research Laboratory announced its intent to award Protonex and its partner, Millennium Cell, an additional $1.02 million to focus on P2 enhancements and manufacturability as well as for performance and reliability testing.
http://www.protonex.com

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2. DOE Publishes Findings of Hydrogen Baseline Knowledge and Opinion Survey
The Department of Energy has published the findings of its first-ever Hydrogen Baseline Knowledge and Opinion Survey. Key conclusions include a direct correlation between technical knowledge of hydrogen and opinions about hydrogen safety. Audiences surveyed included the public, students, state and local government officials, and potential end users in three categories – transportation, businesses needing uninterruptible power, and large power users. The data will help direct DOE hydrogen education activities.
http://www.hydrogen.energy.gov/news_survey.html

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3. DaimlerChrysler Finalizes Phase One of Hydrogen Learning Demonstration Program Project
DaimlerChrysler has completed the first phase of its $88 million Department of Energy Hydrogen Learning Demonstration Program project by delivering on a 30 fuel cell vehicle commitment. The 30th vehicle, an F-Cell fuel cell passenger car, was delivered to the California Fuel Cell Partnership.
http://media.prnewswire.com/en/jsp/latest.jsp;jsessionid=DD6ACB27A3F6D9557F10760FC48F2829.tomcat2?resourceid=3202500&access=EH

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4. DOE Analysis Group Develops Two New Hydrogen Delivery Models
The Department of Energy's H2A Analysis Group announced two new delivery models available for free use. The H2A Delivery Components Model focuses on the components required to deliver liquid or compressed hydrogen to the nozzle of the dispenser. The H2A Delivery Scenario Model uses an engineering economics approach to estimate costs based on market types and sizes, as well as market penetration of hydrogen vehicles.
http://www.hydrogen.energy.gov/h2a_delivery.html

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5. Fuel Cell to Provide Backup Power to Federal Center Operations
A 5-kW Plug Power fuel cell running on hydrogen will provide backup power to the Denver Federal Center of the General Services Administration. The fuel cell is currently being used as a backup generator for the Center's telecommunications system.
http://www.colorado.gov/oemc/press/2006-05-08.pdf

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6. NREL Signs Agreement for Wind to Hydrogen Research Project
The National Renewable Energy Laboratory (NREL) and Xcel Energy signed a cooperative agreement for a "wind to hydrogen" research, development and demonstration project. The hydrogen will be generated via electrolysis using wind power. The new wind-electrolysis system will be at NREL's National Wind Technology Center.
http://www.nrel.gov/news/press/2006/1306_research_agreement.html

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7. DOE Names Twelve Candidate Sites for FutureGen Power Plant
DOE named twelve sites in seven states as candidates to host the $1 billion FutureGen power plant, which would generate electricity and hydrogen from coal while sequestering carbon gases. The FutureGen Alliance plans to deliver a list of finalist sites to DOE this summer. Selection of a final site is scheduled for the fall of 2007.
http://www.fossil.energy.gov/news/techlines/2006/06024-FutureGen_Sites_Proposed.html

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8. Hydrogen Incident Reporting Database Launched by DOE
DOE has launched a Hydrogen Incident Reporting Database to facilitate the sharing of lessons learned and other relevant information gained from experiences using and working with hydrogen. Database users can view a complete alphabetical list of incidents, or look for incidents related to specific details such as damages and injuries, equipment, factors and settings. The database was built and is maintained by Pacific Northwest National Laboratory with funding from DOE. http://www.h2incidents.org/

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9. PPL Becomes Tenth Member of FutureGen Industrial Alliance
PPL Corporation has become the tenth member of the FutureGen Industrial Alliance, a non-profit consortium of global electric utilities and coal companies working with DOE to site and develop FutureGen, a power plant that produces electricity and hydrogen from coal while sequestering carbon gases.
http://www.fossil.energy.gov/news/techlines/2006/06028-PPL_Joins_FutureGen_Alliance.html

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RFP/Solicitation News
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10. University Coal Research Program Master Solicitation Issued
DOE issued its University Coal Research Program solicitation. Technical Topic Area 3 – Materials Sciences – includes two topics related to hydrogen and solid oxide fuel cells. U.S. colleges and universities may submit applications that include cooperation with other academic institutions, industry, and the government. Approximately $2.76 million is expected to be available for this announcement. There is no maximum or minimum award size. DOE anticipates making 5-10 awards under this announcement. Applications are due June 14, 2006. http://e-center.doe.gov/iips/faopor.nsf/3b3cff0a4a1f243485256ec100490e1a/e7cd0ebb1207803c8525715a0067de17?OpenDocument

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11. NERI Issues Solicitation Supporting Nuclear Hydrogen Initiative
The Department of Energy's Nuclear Energy Research Initiative (NERI) has issued a solicitation inviting colleges and universities to submit proposals for projects to advance the state of nuclear science and technology in the U.S. Projects should address key technical issues in support of the Nuclear Hydrogen Initiative, Advanced Fuel Cycle R&D Program and Generation IV Nuclear Energy Systems Initiative. Approximately $4 million is expected to be available for 15-25 awards of up to $200,000 per year. Letters of intent are due June 12, 2006. Applications are due June 28,

2006. https://e-center.doe.gov/iips/faopor.nsf/UNID/8649EAF2B52196D385257165006C6242?OpenDocument

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12. DOE Unveils Two Hydrogen Fuel Initiative Solicitation
DOE's Office of Basic Energy Sciences has issued two solicitations for its Basic Research for the Hydrogen Fuel Initiative program. One solicitation is geared specifically toward DOE National Laboratories. DOE anticipates $17.5 million annually will be available for multiple awards under both solicitations. Pre-applications are required and due July 6, 2006. Selected pre-applicants will be invited to submit formal applications.
http://www.sc.doe.gov/bes/hydrogen.html

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13. DOD SBIR Topics Released, Includes Fuel Cell & Hydrogen Topics
The Department of Defense Small Business Innovation Research solicitation has released its 2006 topics, which include several fuel cell and hydrogen topics such as Compact Direct Methanol Fuel Cell Power System Using Pulsed Electrical Control and Hydrogen Reformation of Renewable Ethanol for Military Applications. Phase I awards are typically $70,000 to $100,000 in size over a period of generally of six to nine months. Deadline for proposals is July 14, 2006.
http://www.acq.osd.mil/osbp/sbir/solicitations/sbir062/

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14. $10 Million for Clean Energy Projects in Pennsylvania
Pennsylvania's Governor Rendell announced $5 million in grants available for a third round of Pennsylvania Energy Development Authority (PEDA) funding, as well as $5 million in available grants for the fourth round of funding under the Pennsylvania Energy Harvest Grant Program. Eligible Energy Harvest proposals include biomass and distributed generation projects. Eligible PEDA projects include fuel cells, landfill gas and biologically derived methane gas. Deadline for both funding programs is July 14, 2006.
http://www.depweb.state.pa.us/news/cwp/view.asp?Q=504920&A=3

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Contract / Funding Awards
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15. Air Force Orders Power Supply Systems from SFC Smart Fuel Cell
The U.S. Air Force has placed a $500,000 order with SFC Smart Fuel Cell for development of a Fuel Cell-based Lightweight Portable Power System (FCPS) for battlefield airmen. The power system will consist of a FCPS soldier portable fuel cell, SFC's high efficiency Power Manager, and a Harris PRC 117 interface.
http://www.smartfuelcell.de/index.php?id=146&L=1&tx_ttnews[tt_news]=103&tx_ttnews[backPid]=1&cHash=9dd60f6c36

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16. Georgetown Selects EPRI to Lead Generation III Fuel Cell Bus Project
Georgetown University has selected a collaborative team headed by the Electric Power Research Institute for the design, development and fabrication of a fuel cell power plant using methanol for the Generation III Fuel Cell Bus. http://fuelcellbus.georgetown.edu

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17. Millennium Cell Receives NSF Phase I SBIR Grant
Millennium Cell has received a Phase I Small Business Innovation Research Program Grant from the National Science Foundation to develop a new hydrogen storage technology based on solid fuel blends that include borohydrides.

http://millenniumcell.com/fw/main/default.asp?DocID=92&reqid=860959

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State Activities
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18. Washington Expands Net Metering Law to Include Biogas, Fuel Cells
The state of Washington has enacted legislation to expand its current net metering law, increasing the maximum limit of a net metered system from 25 kW to 100 kW and extending eligibility to biogas and combined heat-and-power (CHP) systems, including fuel cells. Additionally, net metering will be available to all customers until the cumulative generating capacity of net metered systems equals 0.25% of a utility's peak demand during 1996.
http://apps.leg.wa.gov/billinfo/summary.aspx?bill=2352

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19. Pennsylvania Invites Comments on Draft Energy Development Plan
The Pennsylvania Energy Development Authority (PEDA) is seeking public review and comments on its draft Energy Development Plan. PEDA has so far awarded $15 million in grants and loans for 41 clean energy projects. Written comments on the plan must be submitted by July 19, 2006.
http://www.depweb.state.pa.us/news/cwp/view.asp?a=3&q=506040

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Industry Headlines
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20. BTI Releases State-by-State Analysis of Fuel Cell and Hydrogen Activities
The Breakthrough Technologies Institute, the parent organization of Fuel Cells 2000, released "State Activities that Promote Fuel Cells and Hydrogen Infrastructure Development," a comprehensive state-by-state analysis of state programs and incentives that specify hydrogen, fuel cells and zero emission vehicles. The 230-page report is available free at the Fuel Cells 2000 web site. http://www.fuelcells.org/info/StateActivity.pdf

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21. MTI MicroFuel Cells Announces Strategic Alliance with Samsung Electronics
MTI MicroFuel Cells announced its patented DMFC technology has been chosen by Samsung Electronics to power a series of prototypes designed for Samsung's mobile phone and mobile phone accessories.
http://www.mtimicrofuelcells.com/news/article.asp?id=247

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University Activities
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22. University Fuel Cell Roundup
(summaries contributed by Kathy Haq, Dir. of Outreach and Communications, National Fuel Cell Research Center, UC Irvine, khaq@nfcrc.uci.edu)

A team of researchers at the University of Oxford has developed an enzyme-based biological fuel cell that takes oxygen and hydrogen from the atmosphere to power electrical devices. The enzymes used are isolated from naturally occurring bacteria that have evolved to use hydrogen in

their metabolic process. The unique features of these enzymes are that they are highly selective and tolerant of gases that poison traditional fuel cell catalysts, such as carbon monoxide and hydrogen sulphide. Since the enzymes can be grown, they represent a cheap and renewable alternative to the expensive platinum-based catalysts used by other hydrogen fuel cells. The researchers, based in the Chemistry Department headed by Professor Fraser Armstrong, have built a fuel cell consisting of two electrodes, coated with the enzymes, in a small glass tank containing normal air with a small percentage of added hydrogen. Since the catalysts are selective and tolerant, the gases can be mixed avoiding the need for an expensive fuel separation membrane, which is required for many other types of fuel cells. [28-Apr-2006, *Space Daily*]

VIASPACE Inc. of Pasadena, Calif., announced that its subsidiary, Direct Methanol Fuel Cell Corporation, received cartridge technology from a Harvey Mudd College Engineering Clinic design team. The team, sponsored by DMFCC, completed a year-long project to develop innovative tamper/child resistance and authentication features for fuel cell cartridges designed to be used in portable electronics. The Harvey Mudd College Engineering Clinic program engages a team of students and faculty advisor to solve real-world technical problems for corporate clients. The corporate sponsor retains rights to all intellectual property developed by the team. [4-May-2006, *PR Newswire US*]

Students at Ohio State University's College of Engineering, supported by more than 50 industrial sponsors, will design, build and race the world's first hydrogen-powered land speed research vehicle. The Buckeye Bullet 2 Student Project will be located at Ohio State's Center for Automotive Research under the direction of Dr. Giorgio Rizzoni. Buckeye Bullet 2 will provide a high-performance platform to research and develop petroleum-free hydrogen fuel cell power plants and more fuel-efficient mechanical systems and aerodynamic shapes for tomorrow's vehicles. This student project is led by the same group of engineering students who set U.S. and international land speed records with the world's fastest electric car, The Buckeye Bullet. [7-May-2006, *FuelCellWorks*, http://www.buckeyebullet.com/]

Ohio State University’s Center for Automotive Research is home to the state’s first hydrogen refueling station, one of 15 in the nation, according to the U.S. Department of Energy. Through an OSU partnership with Honda — and a hydrogen-powered Ford Focus that will be on hand for about six weeks during the summer — OSU will study fuel cell power train technology and alternative fuels. The Honda-OSU Partnership, developed in 2000, is funding the majority of the cost for the $75,000 refueling station. The state’s Third Frontier Program, developed to aid high-tech companies and job creation, is also expected to provide funding. The hydrogen for the research will be donated by Praxair Inc. [8-May-2006, *Columbus Business First*]

The University of Delaware's new research vessel, *Hugh R. Sharp,* was formally commissioned on May 7 at the university’s Lewes campus. The $18.6 million-plus state-of-the-art research vessel was christened on July 16, 2005, during ceremonies at the Dakota Creek Industries shipyard in Anacortes, Washington, and arrived at the Lewes campus on Jan. 11. The 146-foot ship, the nation's most advanced coastal research vessel, was designed by Bay Marine of Barrington, Rhode Island, and built by Dakota Creek Industries. It has a modular design to enhance flexibility of use and features modern laboratories onboard, as well as the capability to carry two additional portable laboratories. The diesel-electric vessel's design also may allow for testing and fitting to incorporate new fuel cell technologies as they develop. The ship’s namesake, Sharp, is the great-great-grandson of Eleuthère Irénée du Pont, the founder of the DuPont Co. [8-May-2006, *University of Delaware*]

The Colorado Fuel Cell Center (CFCC) opened its doors to the public May 9, with a ribbon-cutting ceremony hosted by the Colorado Governor's Office of Energy Management and Conservation (OEMC). Nearly 100 representatives from state and local governments, businesses and academia were present at the ceremony. [9-May-2006, *Colorado Fuel Cell Center*]

Researchers at Pacific Northwest National Laboratory and the University of Idaho have devised a new PEM-based catalyst that offers high-powered efficiency and potentially a cheaper, cleaner device for fuel cells. The scientists used nanotechnology to create a catalyst comprised of “walls” that contain platinum and ruthenium deposits. Using supercritical carbon dioxide, a substance that acts as both a liquid and a gas, the researchers say they have succeeded in producing a cleaner and more effective catalyst that could play a key role in fuel cell technology. Unlike the conventional solvents normally used, the new "supercritical fluid technology" offers greater control when applied, and is also completely nontoxic. [9-May-2006, *Adfero via Platinumtoday*]

A research team led by microbiologist Derek Lovley of the University of Massachusetts, Amherst, has boosted the power output of microbial fuel cells more than 10-fold by letting the bacteria congregate into a slimy matrix known as a biofilm. The research suggests that efficient technologies for generating electricity with microbes are much closer than anticipated. Lovley presented the results in early May at a meeting of the Electrochemical Society, in Denver. [11-May-06, *Science News Daily*]

The BOC Group and Tongji University have signed a letter of intent to build the first hydrogen refueling station in Shanghai. The project is part of the Ministry of Science and Technology's national program to commercialize fuel cell vehicles in China. The station is scheduled to be completed by the end of 2006 and will refuel three buses and 20 cars. A team led by Tongji University will be responsible for the project. BOC will provide engineering and procurement services needed to deliver the packaged hydrogen compression, storage, dispensing system and trucked-in compressed gas hydrogen for the new station. Shell, which is funding part of the project, is working with Tongji University on the design, construction, maintenance and operation of the refueling station. BOC has previously participated in trials with hydrogen-fueled buses in London, Detroit, Vancouver, and Perth, Australia. [11-May-2006, *FuelCellWorks*]

Los Alamos National Laboratory announced that it will partner with Japan’s New Energy and Industrial Technology Development Organization (NEDO) and the National Institute of Advanced Industrial Science and Technology (AIST) on the development of fuel cells and hydrogen technologies. The partnership anticipates collaborations among the Los Alamos Institute for Hydrogen and Fuel Cell Research, NEDO’s Fuel Cell and Hydrogen Technology Department, and AIST’s Polymer Electrolyte Fuel Cell Cutting-Edge Research Center. Los Alamos is operated by the University of California for the National Nuclear Security Administration of the U.S. Department of Energy. [16-May-2006, *Los Alamos National Laboratory*]

Four teams of Canadian university students were identified as semi-finalists in a national research poster competition. The student researcher teams were praised for their innovative auto-related research at the AUTO21 Highly Qualified People (HQP) Conference, and will advance to the final round of the Honda Canada HQP Poster Competition. AUTO21, a federal Network of Centres of Excellence, focuses on automotive research and development and the development of highly qualified people for future work in the automotive sector. The graduate and post-graduate level student researchers contribute to AUTO21's 41 research projects. The four finalist teams and their projects include Queen’s University, “On-Board Fuel Cell Powered Auxiliary Power Units.” A panel of judges evaluated a total of 76 teams from 30 universities, with 16 teams selected as semi-finalists. The four winning teams were selected following oral defenses of their research. Together, the semi-finalist and finalist teams received approximately $10,000 in prizes. The four finalist teams now advance to a final round of judging at the AUTO21 Scientific Conference on June 14 in Vancouver, British Columbia, for a chance to win an additional $10,000 in prizes. [17-May-2006, *Canada NewsWire*]

VIASPACE Inc. announced that its subsidiary, Direct Methanol Fuel Cell Corporation (DMFCC), has exercised an option and signed an exclusive worldwide license agreement with the California Institute of Technology (Caltech) for three issued and six pending patents on direct methanol fuel cell technology. The patents include technology on micro and miniature fuel cells for small portable applications. Other intellectual property covered by this license agreement includes an

aerosol feed direct methanol fuel cell, and structures for the cathode and anode. DMFCC has issued 150,000 shares of its common stock to Caltech as consideration for this license, and has agreed to pay certain patent expenses associated with the prosecution and maintenance of patent rights under the license. [17-May-2006, *PR Newswire US*]

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Administration
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Press releases and story ideas may be forwarded to Bernadette Geyer, editor, for consideration at fuelcellconnection @ comcast.net.

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About *Fuel Cell Connection*
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The Sponsors

US Fuel Cell Council -- The US Fuel Cell Council is the business association for anyone seeking to foster the commercialization of fuel cells in the United States. Our membership includes producers of all types of fuel cells, as well as major suppliers and customers. The Council is member driven, with eight active Working Groups focusing on: Codes & Standards; Transportation; Power Generation; Portable Power; Stack Materials and Components; Sustainability; Government Affairs; and Education & Marketing. The Council provides its members with an opportunity to develop policies and directions for the fuel cell industry, and also gives every member the chance to benefit from one-on-one interaction with colleagues and opinion leaders important to the industry. Members also have access to exclusive data, studies, reports and analyses prepared by the Council, and access to the "Members Only" section of its web site. (http://www.usfcc.com/)

National Fuel Cell Research Center -- The mission of the NFCRC is to promote and support the genesis of a fuel cell industry by providing technological leadership within a vigorous program of research, development and demonstration. By serving as a locus for academic talent of the highest caliber and a non-profit site for the objective evaluation and improvement of industrial products, NFCRC's goal is to become a focal point for advancing fuel cell technology. By supporting industrial research and development, creating partnerships with State and Federal agencies, including the U.S. Department of Energy (DOE) and California Energy Commission (CEC), and overcoming key technical obstacles to fuel cell utilization, the NFCRC can become an invaluable technological incubator for the fuel cell industry. (http://www.nfcrc.uci.edu/)

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